

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listing of claims in the above-referenced application.

Listing of Claims:

1. (Currently Amended) A fluorescent lamp comprising:

a first substrate;

a second substrate which is arranged so as to face said first substrate;

a discharge gas which is sealed between said first substrate and said second substrate; and

a plurality of discharge electrodes having discharge projections which are arranged on said first substrate and/or said second substrate, said projections and said discharge electrodes being substantially coplaner and said projections extending from said discharge electrodes in a direction different from a longitudinal axis of said discharge electrodes,

wherein said fluorescent lamp emits light by causing electric discharge in different areas alternated in accordance with said discharge projections and voltages applied to said plurality of discharge electrodes.

2. (Original) A fluorescent lamp unit comprising:

a fluorescent lamp according to claim 1; and

a driving circuit which drives said fluorescent lamp by applying drive voltages to said discharge electrodes of said fluorescent lamp.

3. (Original) The fluorescent lamp unit according to claim 2, wherein:

said plurality of discharge electrodes include a group of first discharge electrodes, and a group of second discharge electrodes; and

said driving circuit repeats a first step and a second step, the first step causing electric discharge in first discharge areas between said first discharge electrodes and said second discharge electrodes by applying a voltage having a negative polarity to said first discharge electrodes and applying a voltage having a positive polarity to said second discharge electrodes, and the second step causing electric discharge in second discharge areas which are different from said first discharge areas at least partially and which are between said first discharge electrodes and said second discharge electrodes by applying a voltage having a positive polarity to said first discharge electrodes and applying a voltage having a negative polarity to said second discharge electrodes.

4. (Currently Amended) The fluorescent lamp unit according to claim 2, wherein:

said plurality of discharge electrodes include a group of first discharge electrodes and a group of second discharge electrodes; and

~~said first discharge electrodes and said second discharge electrodes respectively have projections, and~~ said projections of said first discharge electrodes and said projections of said second discharge electrodes are arranged so as not to face said projections of the other group of discharge electrodes.

5. (Original) The fluorescent lamp unit according to claim 4, wherein

said driving circuit applies drive voltages having polarities which are changed oppositely from each other to said first discharge electrodes and said second discharge electrodes.

6. (Original) The fluorescent lamp unit according to claim 4, wherein

both of said first discharge electrodes and said second discharge electrodes are arranged on said first substrate, or said first discharge electrodes are arranged on said first substrate and said second discharge electrodes are arranged on said second substrate.

7. (Original) The fluorescent lamp unit according to claim 4, wherein

in a case where a voltage having a negative polarity is applied to said first discharge electrodes and a voltage having a positive polarity is applied to said second discharge electrodes, electric discharge is caused in first discharge areas which are between said projections of said first discharge electrodes and said second discharge electrodes, and in a case where a voltage having a positive polarity is applied to said first discharge electrodes and a voltage having a negative polarity is applied to said second discharge electrodes, electric discharge is caused in second discharge areas which are different from said first discharge areas at least partially and which are between said projections of said second discharge electrodes and said first discharge electrodes.

8. (Original) The fluorescent lamp unit according to claim 2, wherein:

said plurality of discharge electrodes include a group of first discharge electrodes, a group of second discharge electrodes, and a group of third discharge electrodes; and

said driving circuit repeats a first discharge step and a second discharge step, the first discharge step causing electric discharge in first discharge areas between said first discharge electrodes and said second discharge electrodes by applying a drive voltage of a positive potential to one of the groups of said first discharge electrodes and second discharge electrodes and applying a drive voltage of a negative potential to the other of the groups of said first discharge electrodes and second discharge electrodes, and the second discharge step causing electric discharge in second discharge areas which are different from said first discharge areas at least partially and which are between said first discharge electrodes and said third discharge electrodes by applying a drive voltage of a positive potential to one of the groups of said first discharge electrodes and third discharge electrodes and applying a drive voltage of a negative potential to the other of the groups of said first discharge electrodes and third discharge electrodes.

9. (Original) The fluorescent lamp unit according to claim 2, wherein:

said plurality of discharge electrodes include a group of first discharge electrodes, a group of second discharge electrodes, and a group of third discharge electrodes;

said first discharge electrodes and said second discharge electrodes are arranged on said first substrate, and said third discharge electrodes are arranged on said second substrate; and

the group of said second discharge electrodes and the group of said third discharge electrodes respectively have projections which are arranged so as not to overlap with said projections of the other group.

10. (Original) The fluorescent lamp unit according to claim 9, wherein

said third discharge electrodes are arranged on said second substrate so as to almost face said second discharge electrodes.

11. (Original) The fluorescent lamp unit according to claim 9, wherein

said driving circuit applies a drive voltage of a negative potential to said second discharge electrodes and said third discharge electrodes alternately, and while applying a drive voltage of a negative potential to said second discharge electrodes or said third discharge electrodes, applies a drive voltage of a positive potential to said first discharge electrodes.

12. (Original) A liquid crystal display device comprising the fluorescent lamp unit according to claim 2 as a back light.

13. (Original) The liquid crystal display device according to claim 12, wherein said fluorescent lamp emits light by causing electric discharge in first discharge areas between said first discharge electrodes and said second discharge electrodes and in second discharge areas which are different from said first discharge areas at least partially and which are between said first discharge electrodes and said third discharge electrodes selectively in accordance with polarities of voltages applied to said plurality of discharge electrodes.

14. (Original) The liquid crystal display device according to claim 13, wherein

said driving circuit applies to said plurality of discharge electrodes, drive voltages for turning on both of said first and second discharge areas when light intensity of said back light is at a maximum level, and drive voltages for turning off one of said first and second discharge areas when light intensity of said back light is at a minimum level.

15. (Original) The liquid crystal display device according to claim 12, wherein

said driving circuit applies to said plurality of discharge electrodes, drive voltages for controlling said first and second discharge areas to emit light during 50% of a predetermined period, when light intensity of said back light is at a maximum level.

16. (Original) The liquid crystal display device according to claim 12, wherein

said driving circuit applies to said plurality of discharge electrodes, drive voltages for turning on one of said first and second discharge areas and also for controlling the discharge areas which are turned on to emit light during 10% of a predetermined period, when light intensity of said back light is at a minimum level.

17. (Original) The liquid crystal display device according to claim 12, wherein

said driving circuit controls one of said first and second discharge areas to emit light by causing electric discharge during 20% of a predetermined period, when light intensity of said back light is at a minimum level.

18. (Original) The liquid crystal display device according to claim 12, wherein

said driving circuit controls both of said first and second discharge areas to emit light by causing electric discharge during 100% of a predetermined period, when light intensity of said back light is at a maximum level.

19. (Original) The fluorescent lamp unit according to claim 2, wherein

a reflection film is adhered to said first substrate.

20. (Original) The fluorescent lamp unit according to claim 2, wherein

said second or third discharge electrodes are made of a transparent conductive material in a case where they are arranged on said second substrate.

21. (Currently Amended) A method of emitting light from a lamp (back light) in which a discharge gas is sealed, and first and second discharge electrodes are formed, said method comprising:

causing electric discharge in first discharge areas between the first and second discharge electrodes in accordance with discharge projections of said first discharge electrodes by applying a voltage having a negative polarity to the first discharge electrodes and a voltage having a positive polarity to the second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through a phosphor, said projections and said discharge electrodes being substantially coplaner and said projections extending from said discharge electrodes in a direction different from a longitudinal axis of said discharge electrodes;

causing electric discharge in second discharge areas which are different from the first discharge areas at least partially and which are between the first and second discharge electrodes in accordance with discharge projections of said second discharge electrodes by applying a voltage having a positive polarity to the first discharge electrodes and a voltage having a negative polarity to the second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through the phosphor; and

controlling said causing electric discharge in the first discharge areas and said causing electric discharge in the second discharge areas to be repeated.

22. (Currently Amended) A method of emitting light from a lamp (back light) in which a discharge gas is sealed, and first discharge electrodes, second discharge electrodes, and third discharge electrodes are formed, said method comprising:

causing electric discharge in first discharge areas between the first and second discharge electrodes in accordance with discharge projections of said second discharge electrodes by applying a drive voltage of a positive potential to one of the first and second discharge electrodes and a drive voltage of a negative potential to the other of the first and second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through a phosphor, said projections and said discharge electrodes being substantially coplaner and said projections extending from said discharge electrodes in a direction different from a longitudinal axis of said discharge electrodes;

causing electric discharge in second discharge areas which are different from the first discharge areas at least partially and which are between the first and third discharge electrodes in accordance with discharge projections of said third discharge electrodes by applying a drive voltage of a positive potential to one of the first and third discharge electrodes and a drive voltage of a negative potential to the other of the first and third discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light via the phosphor; and

controlling said causing electric discharge in the first discharge areas and said causing electric discharge in the second discharge areas to be repeated.

23. (Original) The method of emitting light according to claim 21, wherein

in said controlling, it is controlled that drive voltages for turning on both of the first and second discharge areas are applied to the first and second discharge electrodes when light emission intensity is at a maximum level, and that drive voltages for turning off one of the first and second discharge areas are applied to the first and second discharge electrodes when light emission intensity is at a minimum level.

24. (Original) The method of emitting light according to claim 22, wherein

in said controlling, it is controlled that drive voltages for turning on both of the first and second discharge areas are applied to the first to third discharge electrodes when light emission intensity is at a maximum level, and that drive voltages for turning off one of the first and second discharge areas are applied to the first to third discharge electrodes when light emission intensity is at a minimum level.

25. (Original) The method of emitting light according to claim 21, wherein

in said controlling, it is controlled that drive voltages for turning on one of the first and second discharge areas and for controlling the discharge areas which are turned on to emit light during 10% of a predetermined period are applied to the first and second discharge electrodes when light intensity of the back light is at a minimum level.

26. (Original) The method of emitting light according to claim 22, wherein

in said controlling, it is controlled that drive voltages for turning on one of the first and second discharge areas and for controlling the discharge areas which are turned on to emit light during 10% of a predetermined period are applied to the first to third discharge electrodes when light intensity of the back light is at a minimum level.

27. (Original) The method of emitting light according to claim 21, wherein

in said controlling, one of the first and second discharge areas are controlled to emit light by causing electric discharge during 20% of a predetermined period when light intensity of the back light is at a minimum level.

28. (Original) The method of emitting light according to claim 22, wherein

in said controlling, one of the first and second discharge areas are controlled to emit light by causing electric discharge during 20% of a predetermined period when light intensity of the back light is at a minimum level.

29. (Currently Amended) ~~A~~ The fluorescent lamp of Claim 1, comprising:

a first substrate;

a second substrate which is arranged so as to face said first substrate; --

a discharge gas which is sealed between said first substrate and said second substrate; and

a plurality of discharge electrodes having discharge projections which are arranged on said first substrate and/or said second substrate, wherein said fluorescent lamp emits light by causing electric discharge in different areas alternated in accordance with said discharge projections and voltages applied to said plurality of discharge electrodes and wherein said discharge projections have a shape selected from at least one of: a semicircular shape, a semi-circumferential shape, a circumferential shape, a double semi-circumferential shape, and an integrated shape of one or more linear projections.

30. (Currently Amended) A The method of Claim 21, emitting light from a lamp (back light) in which a discharge gas is sealed, and first and second discharge electrodes are formed, said method comprising:

causing electric discharge in first discharge areas between the first and second discharge electrodes in accordance with discharge projections of said first discharge electrodes by applying a voltage having a negative polarity to the first discharge electrodes and a voltage having a positive polarity to the second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through a phosphor;

causing electric discharge in second discharge areas which are different from the first discharge areas at least partially and which are between the first and second discharge electrodes in accordance with discharge projections of said second discharge electrodes by applying a voltage having a positive polarity to the first discharge electrodes and a voltage having a negative polarity to the second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through the phosphor; and

controlling said causing electric discharge in the first discharge areas and said causing electric discharge in the second discharge areas to be repeated, wherein said discharge projections have a shape selected from at least one of: a semicircular shape, a semi-circumferential shape, a circumferential shape, a double semi-circumferential shape, and an integrated shape of one or more linear projections.

31. (Currently Amended) A The method of Claim 22, emitting light from a lamp (back light) in which a discharge gas is sealed, and first discharge electrodes, second discharge electrodes, and third discharge electrodes are formed, said method comprising:-

causing electric discharge in first discharge areas between the first and second discharge electrodes in accordance with discharge projections of said second discharge electrodes by applying a drive voltage of a positive potential to one of the first and second discharge electrodes and a drive voltage of a negative potential to the other of the first and second discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light through a phosphor;

causing electric discharge in second discharge areas which are different from the first discharge areas at least partially and which are between the first and third discharge electrodes in accordance with discharge projections of said third discharge electrodes by applying a drive voltage of a positive potential to one of the first and third discharge electrodes and a drive voltage of a negative potential to the other of the first and third discharge electrodes, and converting ultraviolet rays caused by the electric discharge into visible light via the phosphor;
and

controlling said causing electric discharge in the first discharge areas and said causing electric discharge in the second discharge areas to be repeated, wherein said discharge projections have a shape selected from at least one of: a semicircular shape, a semi-circumferential shape, a circumferential shape, a double semi-circumferential shape, and an integrated shape of one or more linear projections.